Subsurface Geologic Mapping of the Columbia Basin Groundwater Management Area: Results and Applications

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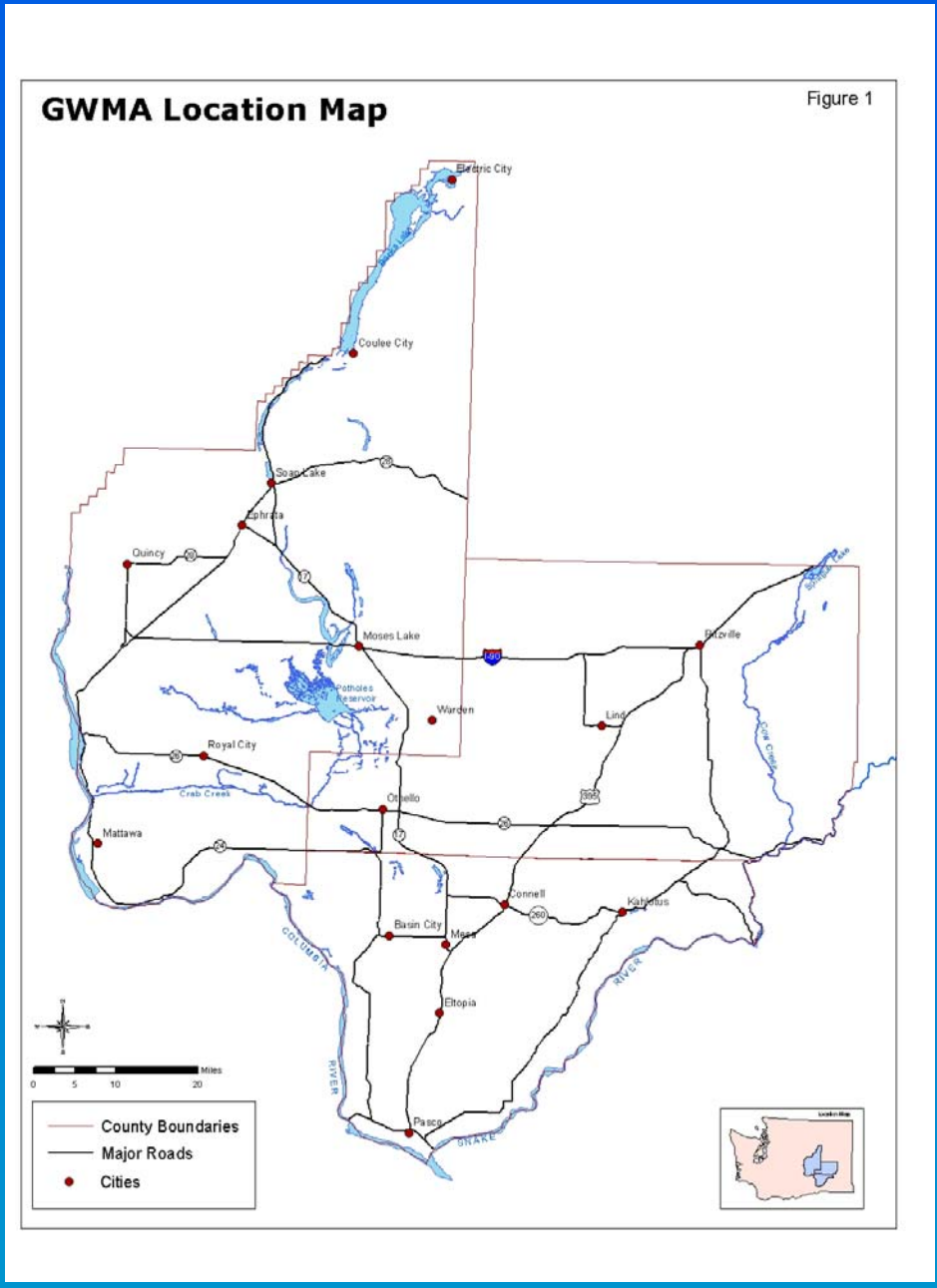
Introduction

- **Project – Geologic delineation, nitrate-N**
- **Presentation – Mapping results, aquifer continuity and aquifer hydraulic connection**
- **Acknowledgements – FCD, GWMA, EPA, 25+ years of other work**

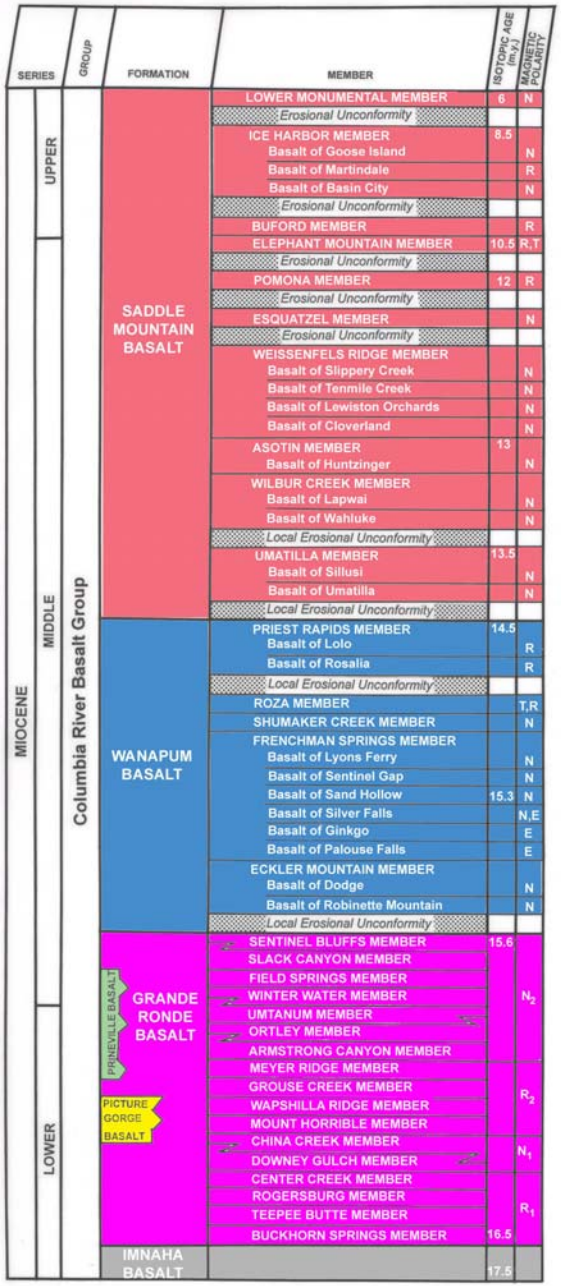
Location

- 3 Counties, east-central Washington
- 6000 square miles
- Groundwater, primary water source

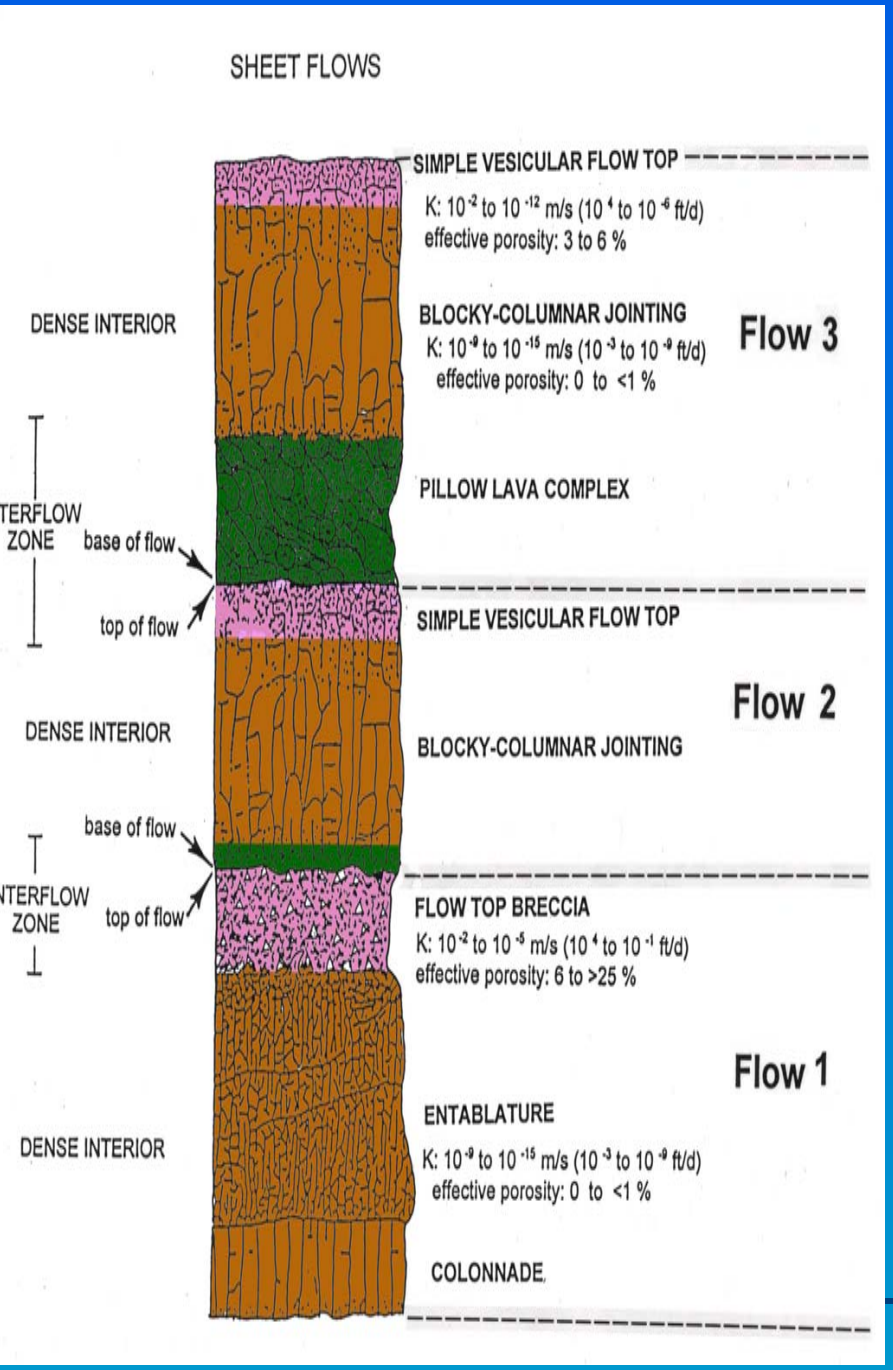


Background - Stratigraphy

- Quaternary Sediments
- Ringold Formation
- CRBG
  - Saddle Mountains Basalt (6 mbrs)
  - Wanapum Basalt (3 mbrs)
  - Grande Ronde Basalt (1 mbr)



Background- CRBG Hydrogeology

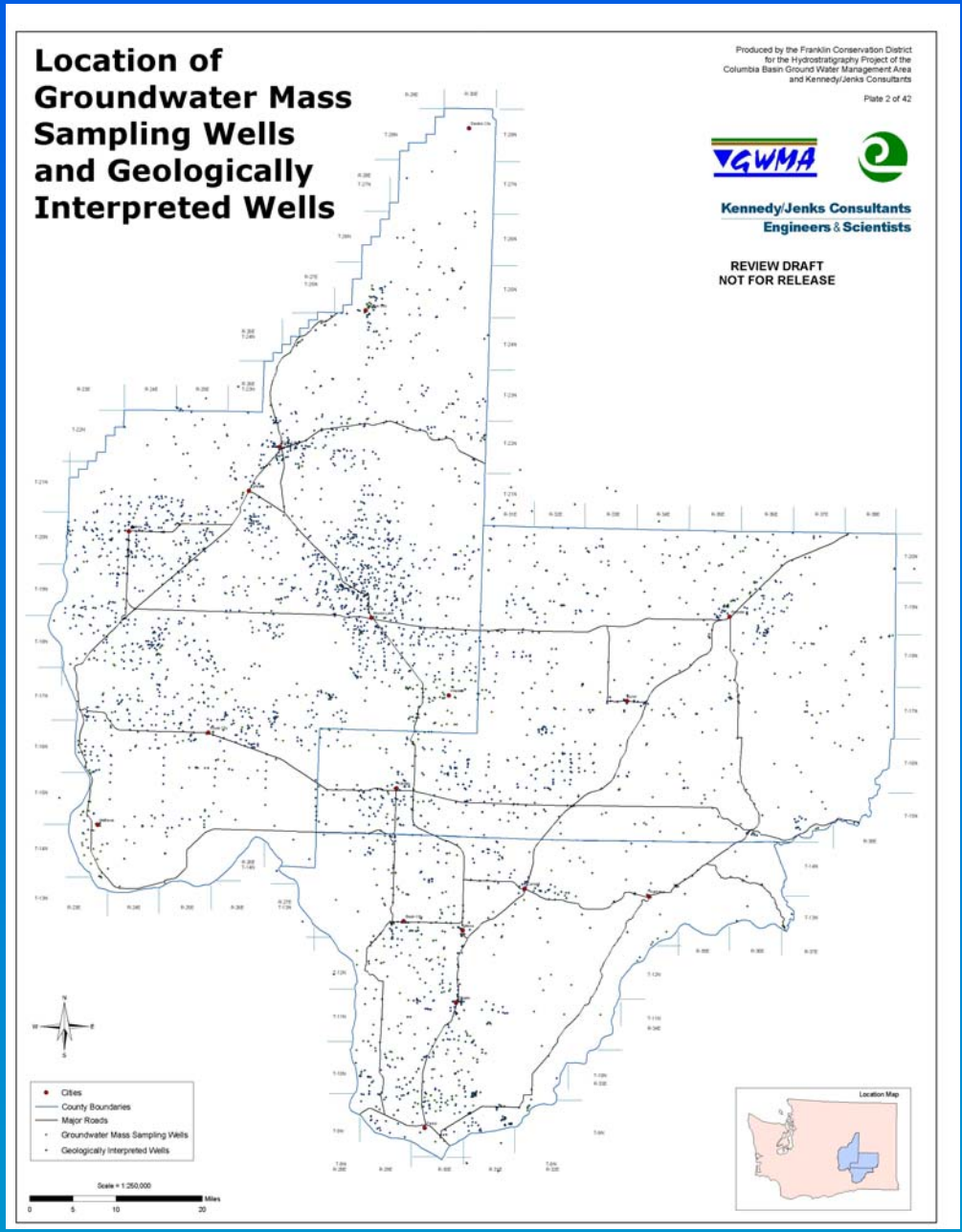


Background – Aquifer Discontinuities

- **Basalt flow edges**
- **Coulees/erosion**
- **Wells**
- **Structures**

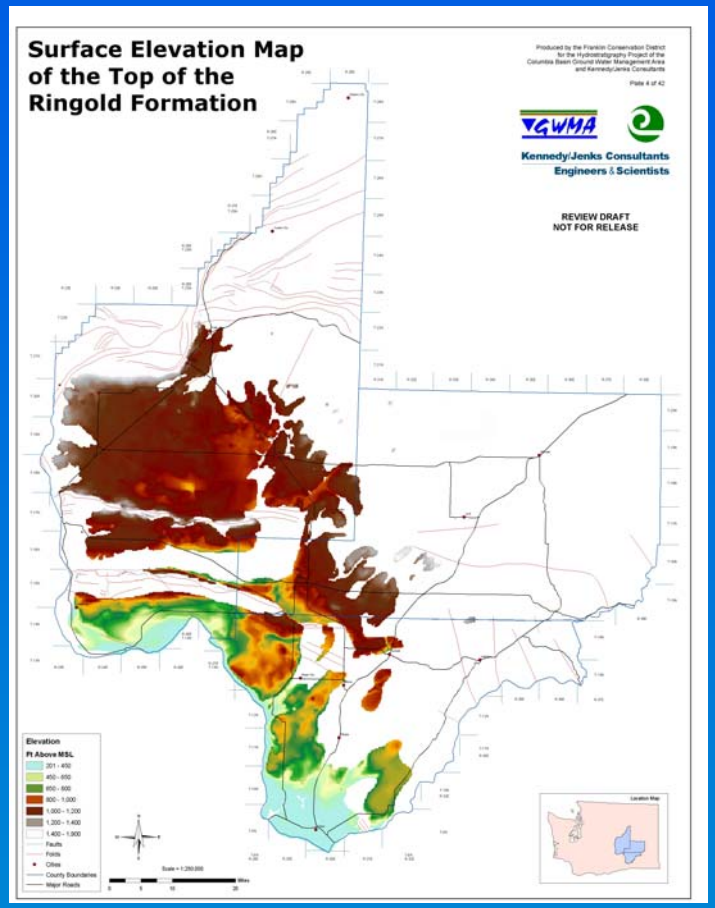
Mapping Data Base

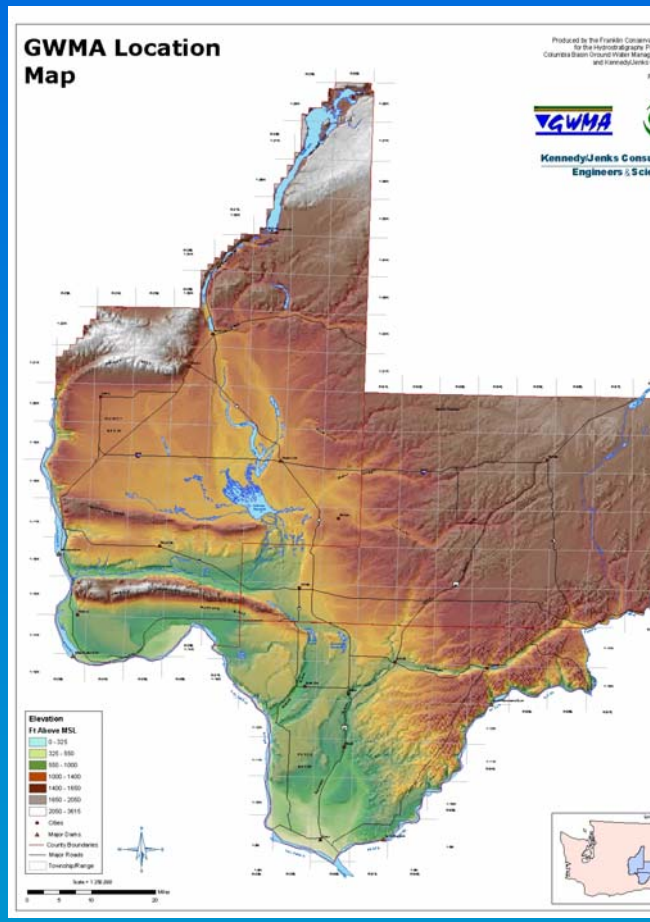
- ~3000 of >15,000 wells
- Personal files (NC, SPR)
- Geochemistry
- Outcrops and mapping



Results - Suprabasalt sediments

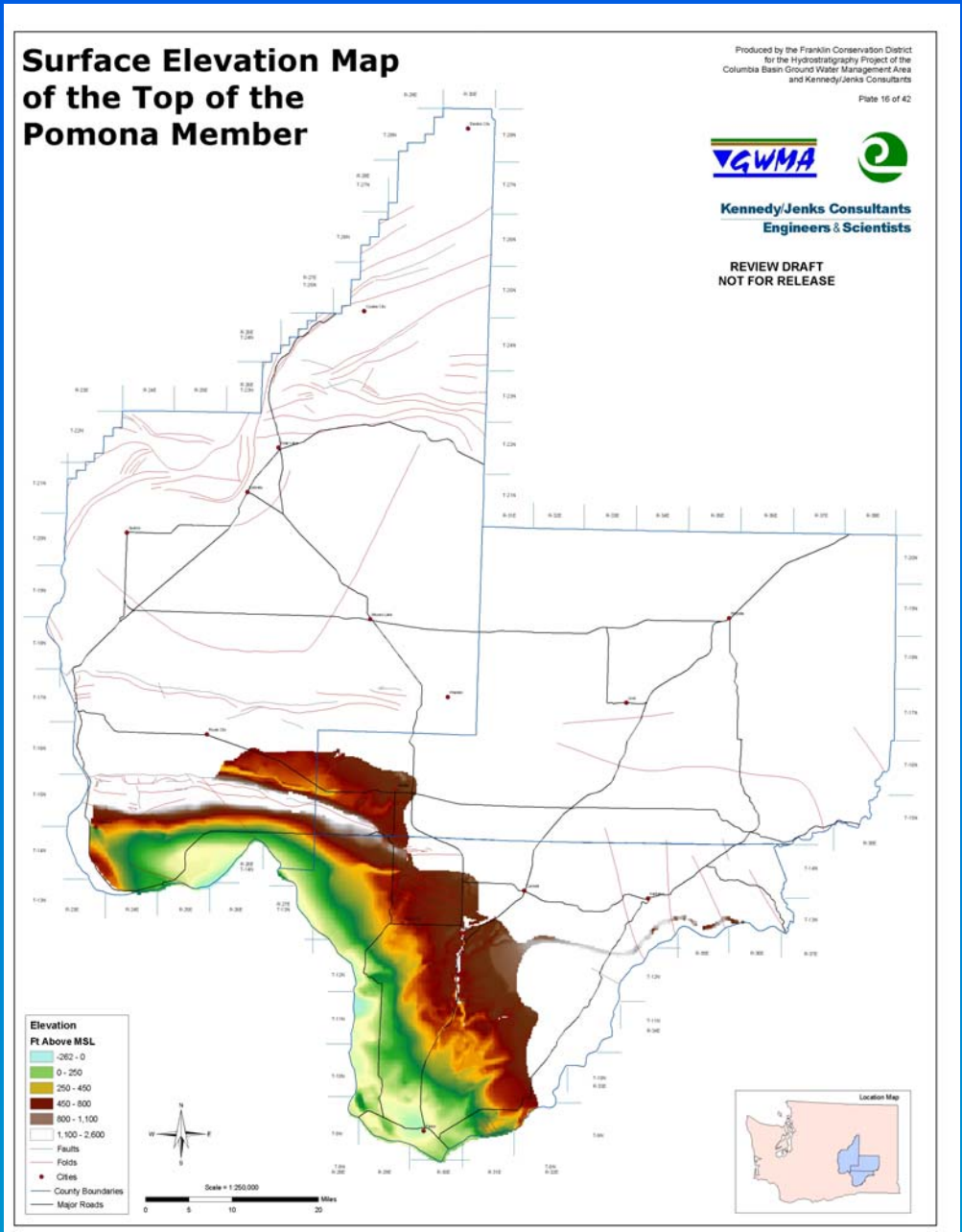
- **Ringold - Basins**
- **Flood deposits - coulees**





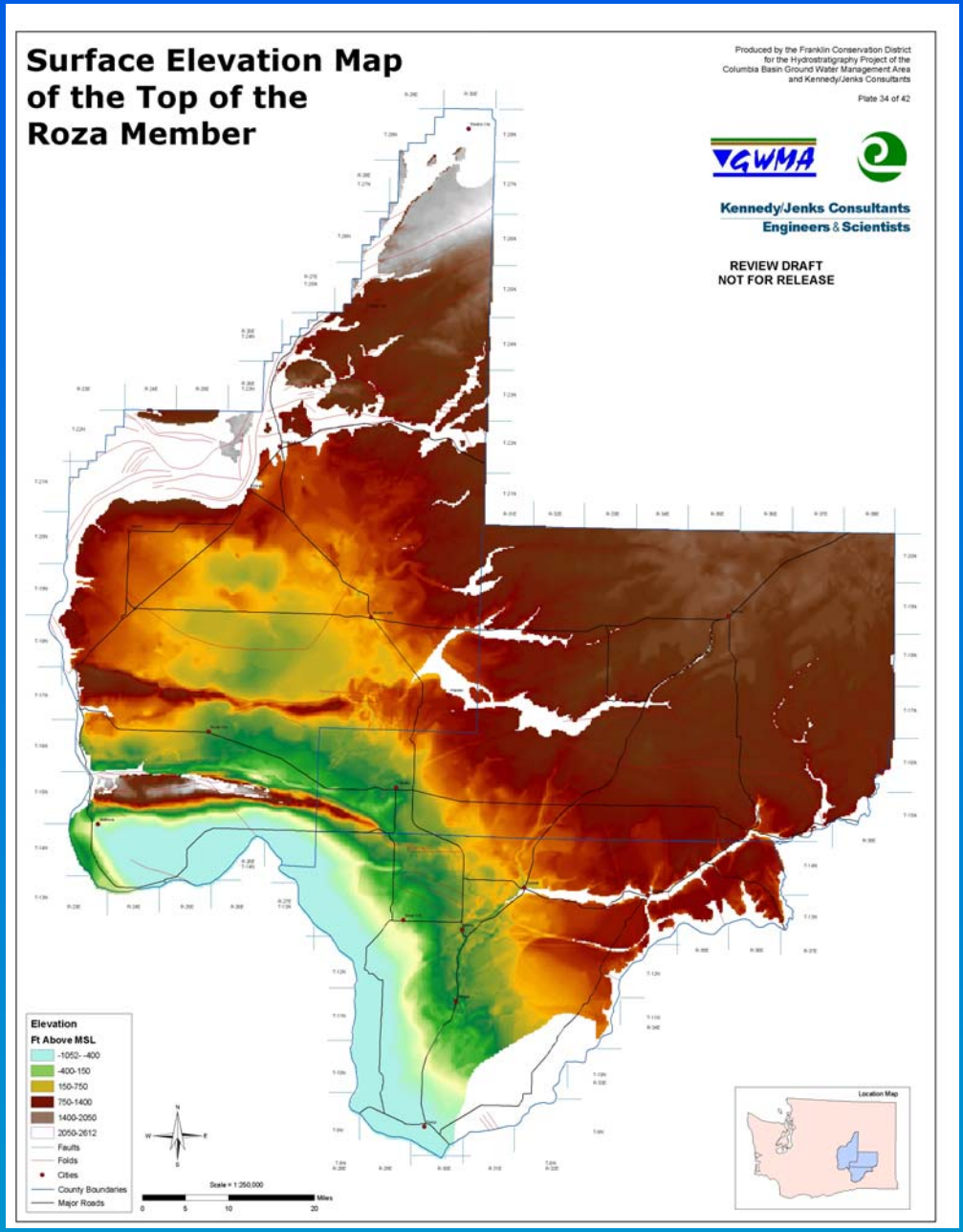
Results – Saddle Mountains Basalt

- **Emplacement – smaller volume**
- **Erosion – more time**
- **Limited regional extent – vertical aquifer connections**



Results – Wanapum Basalt

- More widespread
- Emplacement – structure (continues post emplacement) – subdivides aquifers
- Erosion – coulee, Ringold, and SMB incision – vertical aquifer connections

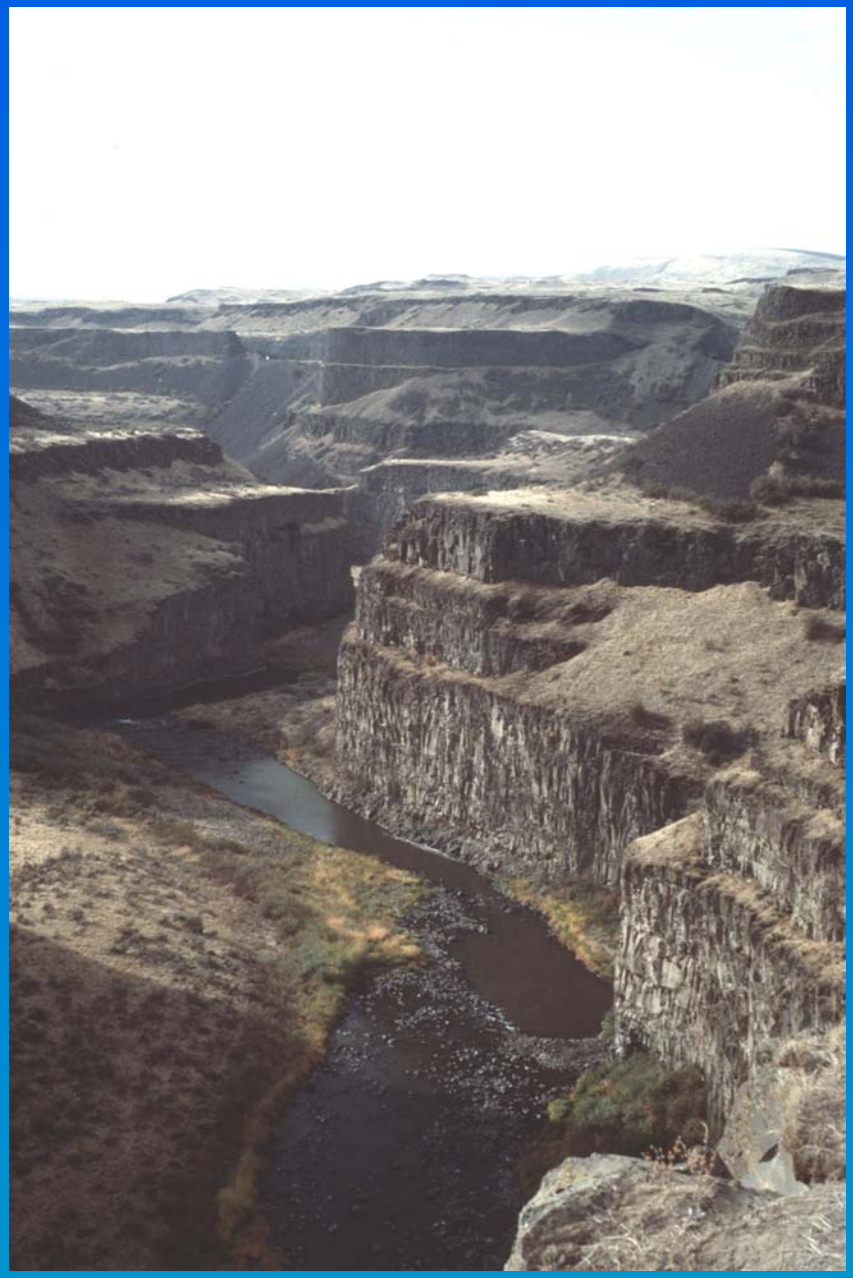


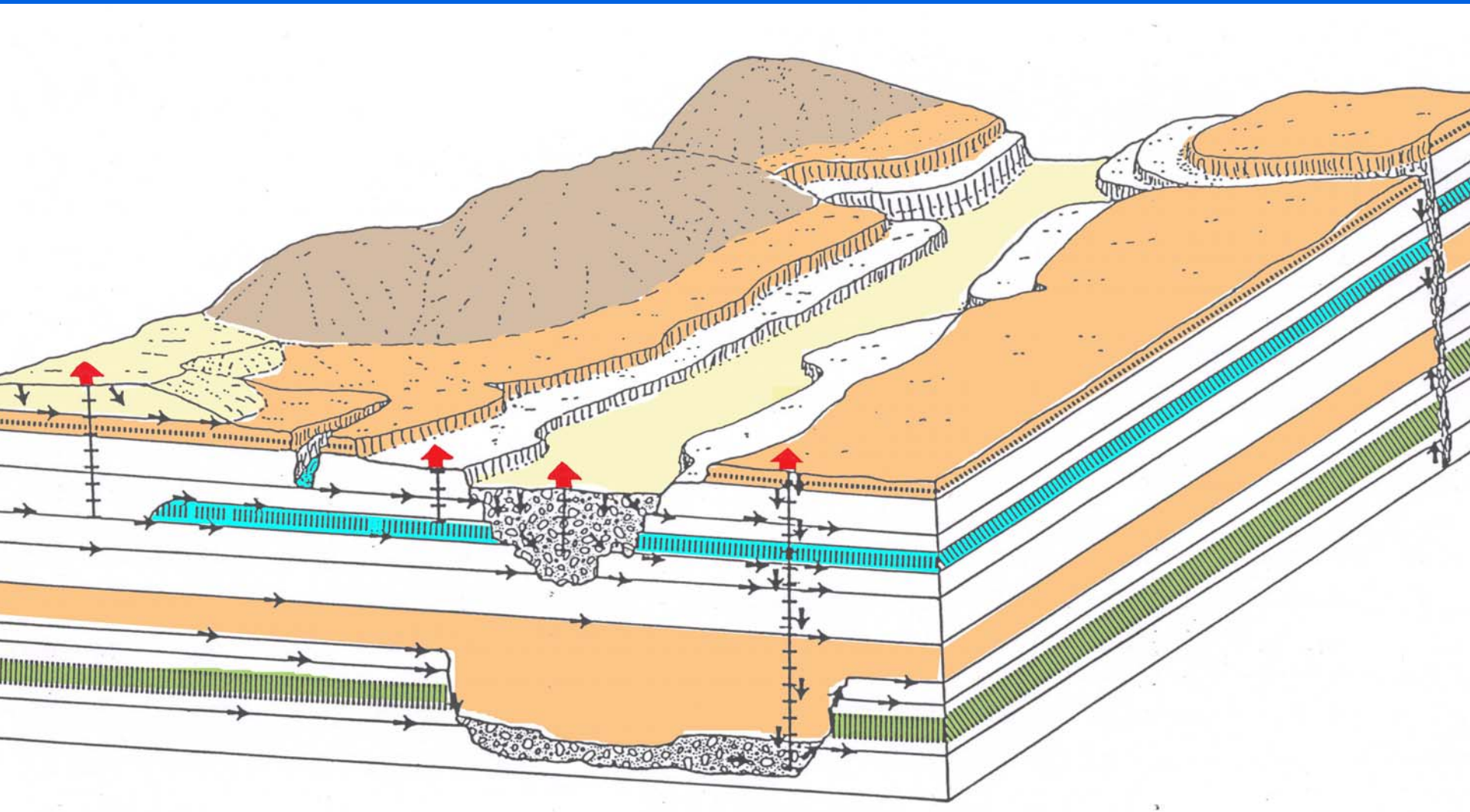
Results – Grande Ronde Basalt

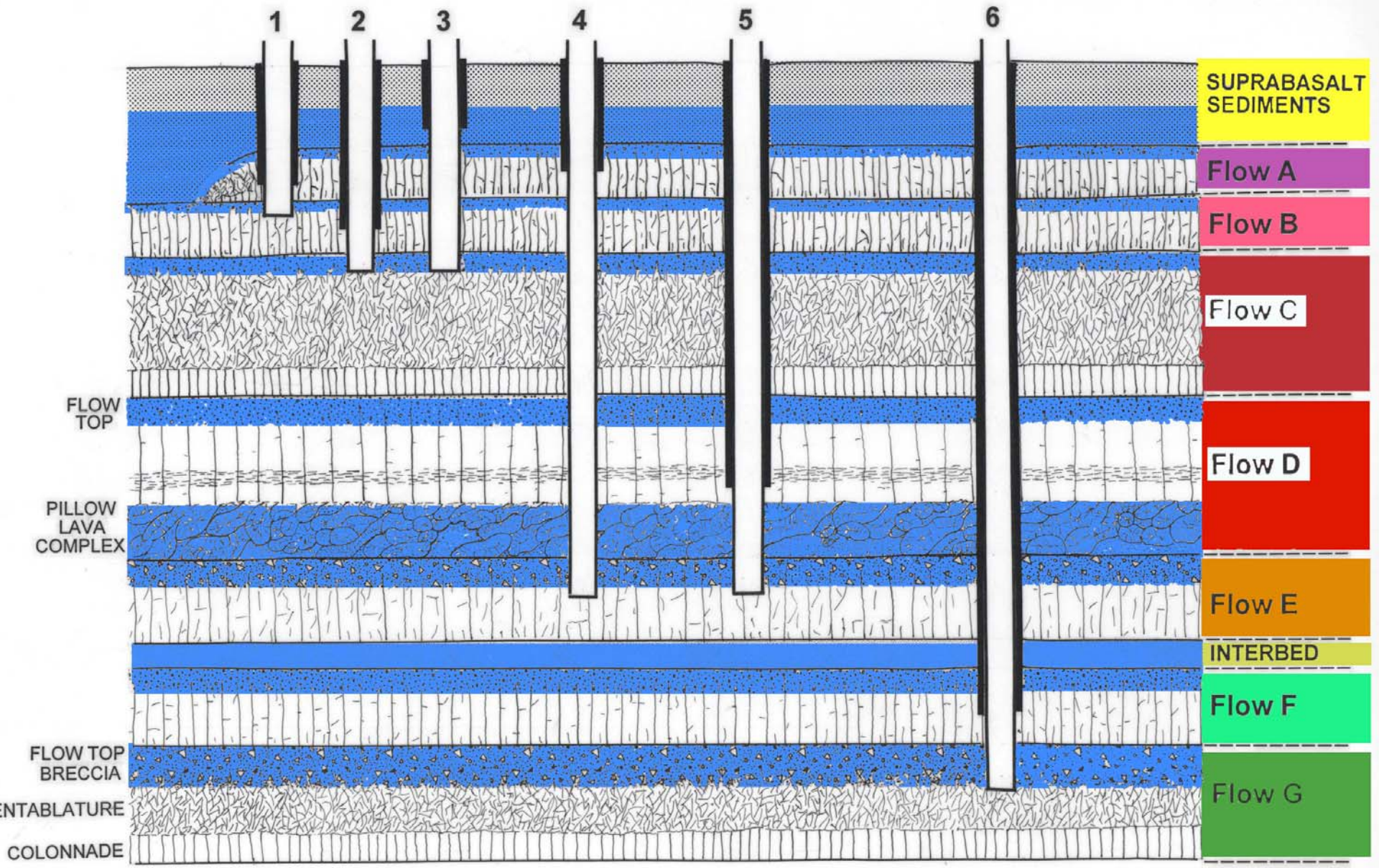
- **Regionally widespread**
- **Emplacement – structure (continues post emplacement) – subdivides aquifers**
- **Erosion – limited, deepest coulees and canyons**

Summary

- Major aquifer host rocks mapped
- Identify aquifer lateral continuity, aquifer vertical connections
  - Sediment – basins coulees
  - SMB – erosion
  - WB – erosion and structures
  - GRB - structures



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6
SUPRABASALT SEDIMENTS
Flow A
Flow B
Flow C
Flow D
Flow E
INTERBED
Flow F
Flow G
FLOW TOP
PILLOW LAVA COMPLEX
FLOW TOP BRECCIA
ENTABLATURE
COLONNADE